UNIVERSITY OF ILLINOIS

April 17 19 89

THIS IS TO CERTIFY THAT THE THESIS PREPARED UNDER MY SUPERVISION BY

Thomas Patrick Golden

ENTITLED Effects of Misattribution and Mood on Risk-taking

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE

DEGREE OF Bachelor of Science

Instructor in Charge

APPROVED:

HEAD OF DEPARTMENT OF

C-1364

Effects of Misattribution and Mood on Risk-taking

By

Thomas P. Golden

Thesis

for the

Degree of Bachelor of Science

in

Liberal Arts and Sciences

College of Liberal Arts and Sciences

University of Illinois

Urbana, Illinois

1989

Table of Contents

I. Abstract 3

II. Introduction 4

III. Method 34

IV. Results 40

V. Discussion 46

VI. Bibliography 52

VII. Tables 58

Abstract

Recent studies indicate that people may use their moods when making judgments, by interpreting their emotions as affective reactions to stimuli in the environment. It has also been shown that subjects can be made to ignore these feelings if they are encouraged to misattribute them to an irrelevant source. In this study, subjects were placed in happy or sad moods, and then asked to rate how good and how probable various outcomes were for a series of gambles, and to indicate how risky they wanted to be in their decisions about them. Results showed that the mood of subjects as well as the features of the gambles (such as size, result, and emphasis on wins or losses) played an interactive role in determining if the subjects would opt for certainty or risk. Also, some subjects were given a chance to discount their feelings. When they did, the misattribution effect was observed, under certain conditions, and subjects ignored their affect induced by the mood induction in making their decisions about the gambles.

The effects of mood on cognition and thought are extensive and varied. Emotion produces changes in social behavior (e.g., Weyant, 1978), attention (e.g., Isen & Shalker, 1982), memory (e.g., Bower, 1981), risk taking (e.g., Isen & Patrick, 1983), decision making (e.g., Isen, Means, Patrick, & Nowicki, 1982), information acquisition (Batson, Coke, Chard, Smith, & Taliaferro, 1979), problem solving (e.g., Isen, Daubman, & Nowicki, 1987), and creativity (e.g., Isen, Johnson, Mertz, & Robinson, 1985).

There is little doubt then, that mood plays an important role in determining how we act and think in our lives. We experience the effect first hand nearly every day. Imagine the following situation:

On your way to your office you meet a good friend of yours on the street whom you have not seen in awhile. She chats with you for a moment, and with sincerity complements you on how good you look. Several moments later you part and continue on your way.

Positive events such as this have a significant effect on how people act and view the world. If the previous scene had happened to you, chances are you would notice other pleasant things about the day, such as the weather.

If someone else stopped you and asked how you were doing, you would most likely reply that you were, "doing fine," with a little more enthusiasm than you might ordinarily, and you would be more likely to give someone a hand if they needed help (e.g., carrying some packages). You might completely ignore minor unpleasant events that otherwise might annoy you.

I will examine the three primary theories about mood's effect on cognition. First, however, I will describe a typical study performed to study the mood-cognition interaction.

Isen, Shalker, Clark, and Karp (1978) performed a study in a shopping mall, in which subjects were approached by a confederate of the experimenter and offered notepads (to females) or nail clippers (to males). About fifty yards away, another confederate approached the same subject and asked some questions relating to the performance of the subject's automobile and television set.

Subjects who were in good moods (induced by the presentation of a notepad or nail clipper) tended to make significantly more positive judgments than the control group, rating the performance of their cars and televisions as more satisfactory.

This study, typical of studies on mood effects, exhibits several points of interest. First, subjects were asked to make judgments about something from their past - their cars and televisions - so evaluations were based on memory. Evaluations of objects in memory are not required for mood effects, but it is worth noting that these effects occur for familiar as well as novel stimuli. The link between mood and memory is an important one, so I shall examine the effects of mood on memory as it applies to each of the theories.

A second feature of the study is that nothing was said about televisions or cars until judgments were asked for. That is, the interviewers did not ask subjects to think about all of the positive aspects of these items and then make a judgment. In some way, the positive mood induced by the notepad or nail clippers affected evaluations of the completely unrelated cars and televisions. This has been referred to as "priming," and I shall examine it extensively, as it is the backbone for one of the major theories about the effects of mood.

Finally, notice the extent of the effect involved. Consider that a TV and a car are two very familiar objects in person's life. The subjects undoubtedly had a great

deal of interaction with these two items and most probably had made an appraisal of each long before asked by the interviewer. Despite the fact that these very strong evaluations already existed in the subjects' memory and that the mood was induced merely by a pad of paper or a nail clipper, there was a very strong effect on the judgments made by the subjects in a positive mood. Not only is the effect of mood, at least on evaluations, quite potent, but it can be produced by the smallest of manipulations.

I will now turn to the theories of mood's influence on cognition. The first theory involves mood as a priming cue, treating mood as an important cue of memories. The second theory involves mood as a source of motivation, suggesting that positive mood can serve as a goal and thus direct the actions of a person. The third theory involves mood as information, and treats emotion as a source of information for decision making and evaluation.

Mood as a Priming Cue

Understanding the concept of priming requires that certain assumptions be made about the way memory works and the way in which decisions and judgments are made.

Models of Memory

Understanding the theory of priming requires an adequate understanding of the way memory works. Categorizing of information plays a central role in understanding how priming is thought to work. I shall take a brief look at two major theories of memory: the Bin Model and the Network Model.

The Bin Model. As described by Wyer and Srull (1980), this model assumes that long term memory comprises storage bins which contain a concept or set of concepts. A unique label that identifies its contents is given to each bin.

Bins may contain information about specific people or events (e.g., your sister Mary or the trip to the cottage last weekend), prototypic people or events (e.g., a psychologist or a visit to the dentist), or general semantic concepts (e.g., aggressive, perilous, pleasant). The information contained in any one of these bins is known as a schema.

Material is usually contained in more than one bin. For example, if James bought Carol a present, a representation of the incident would be stored in the bins labeled "James," "Carol," and a bin called "James gives Carol a present." In addition, a note about James might be

placed in a bin labeled "Generous actions." Thus, a simple event would be stored in many places, according to the categories that could be derived from it.

The Network Model. More completely known as the Associative Network Model (Anderson & Bower,1973), this is the older and more widely known of the two models. This model supposes that memory consists of units called nodes, which serves the same function as bins. Unlike the Bin Model, however, in which related memories are stored "inside" the bin, memories that are related to a particular node in question are also nodes themselves. Each node is connected to all the other nodes that are associated with it, forming interconnected clusters of associations. Using our previous example, "James," "Carol," "James gives Carol a present," and "Generous" would all have separate nodes and would all be connected to each other.

The Availability Principle

When people make decisions or judgments, they often use short-cuts, or heuristics, to make mental processing easier. One such heuristic is the use of whatever information is most available for decisions and judgments instead of trying to recall all pertinent data. Tversky and Kahneman (1972) called this the availability principle.

Not only do people use these available thoughts as the basis for making judgments, but they also tend to assess frequency or probability of an event by the ease with which instances can be brought to mind. That is, the easier it is for a person to recall an event, the more likely a person will overestimate the frequency or probability of that event.

For example, Tversky and Kahneman (1973) asked subjects to read a list of names, half of which were male and half female. Although both genders were equally represented, subjects consistently overestimated the number of people belonging to the gender that contained a larger proportion of famous people. That is, if the list contained more famous women than famous men, subjects would say that there were more women on the list, even though the totals for males and females were exactly the same. The accessibility of the famous people led to an overestimation of the frequency of that gender in the list.

Theory of Priming

The theory of priming suggests that thinking about something makes related thoughts more easily accessible for judgments, decision making, or problem solving. For example, you may be wondering if you will have enough time

to finish your project, and that reminds you to pick up your watch from the jewelers, which makes you think you also have to pick up some lawn fertilizer, which inspires you to start planning your garden, which makes you wonder what vegetables you'll have for dinner.

When a memory is accessed, it is said to be activated. In the Bin Model, this activation also causes the other bins to be opened, releasing related information. For the Network Model, activation at a node causes other nodes connected to it also to be activated, bringing related memories to mind. Whatever the process, the result is the same: memories related to the initial thought are made more accessible and the person is more likely to think about them.

One of the earliest experiments done on priming involved the cued recall of material. Subjects' recall of material could be improved by cuing, or priming, their memory with certain words related to the memorized material.

Meyer and Schvaneveldt (1971) found that when subjects are asked to judge whether a letter string is a word, their response time decreases if it is preceded by an associated word rather than by an unrelated word or nonsense string.

For example, Tulving and Pearlstone (1966) found that when subjects are shown a word such as doctor and then are asked whether nurse is a word, they respond more quickly than if the first word had been computer or some other unrelated word.

Cognitive priming has been well documented in a variety of studies. Loftus (1973) found that subjects were able to recall an item from a category more quickly when cued with another instance from the category than if cued with unrelated words. Kozlowski (1977) found that cueing subjects with words that rhymed with the correct word improved recall success and speed. In addition, Gruneberg and Monks (1974) found a substantial improvement in attempted recall when subjects were cued by the first letter of the correct word.

Priming and Mood

Priming has its roots in the study of cognitive organization and memory, but it is not limited to purely cognitive effects.

Bower (1981) proposed that emotions as well as cognitive schemas serve as nodes in memory networks and function in much the same way. In terms of the network model, if a certain emotional node is activated, other

nodes for schemas associated with that emotion should also be activated. Thus, subjects placed in a positive mood should recall more positive events from their lives. These memories, activated by the current mood, are referred to as mood congruent memories.

The memories that are primed become more available. As the availability principle states, this makes people more likely to use the primed information for decisions and judgments, sometimes to the point of error.

Teasdale and Fogarty (1979) found that subjects in a good mood exhibited faster reaction times when trying to recall positive material than neutral or negative material. This effect can be explained by assuming that the positive mood had primed positive memories, including the words to be recalled.

Rholes, Riskind, and Lane (1987) had subjects read statements about themselves (e.g., I am a very capable person or I am worthless) or had them read somatic descriptions of good or bad moods (e.g., I feel tired and listless or I feel energetic). After a mood had been induced, the subjects tried to recall positive or negative experiences from their lives. Rholes, et al. found that subjects who made statements about themselves recalled life

events that matched the valence of their mood more quickly than events of the opposite valence.

Interestingly, the moods induced by somatic descriptions did not have a pronounced effect on the type of events recalled. One possible explanation, which I will discuss later, is that the attribution made by the subjects about the source of the mood is also important.

To the extent that judgments about a stimulus reflect what a person recalls about that stimulus, then explanations for mood-biased memories will also account for mood-biased judgments. Hence, the priming explanation for the effect of mood on judgment stresses the greater accessibility of mood congruent memories than non-congruent memories.

Effects of Priming of Mood on Judgments

Mood affects judgments. The effect of mood on memories was stressed as the explanation for the judgments in the shopping mall study by Isen et al. (1978) which was described earlier. A free gift induced a mildly positive mood among subjects. When they were later asked to make a judgment about their satisfaction with their televisions or automobiles, the positive aspects had already been primed, and thus were more accessible. As the availability

principle would suggest, the subjects used the information that was most available to them to make their judgments: namely, the positive information relating to these two possessions.

Isen et al. performed another experiment in which subjects were exposed to a list of positively and negatively valenced words. Then they were asked to recall as many words as they could. Between the learning and the recall, one half of the group performed a task at which they succeeded, while the other performed a task in which they failed. As predicted, the subjects were better able to recall words that were consistent with their emotional state at the time of recall. That is, subjects who succeeded at their task recalled more positive words while subjects who failed recalled more negative words.

Isen and Shalker (1982) used two different means of inducing mood in their subjects. They used four groups, two with positive moods, one with a neutral mood, and one with a negative mood. The negative group and one of positive groups had their mood induced by success or failure on a fictitious test of perceptual-motor and problem-solving skills. The other positive group was "paid" to be in a good mood: When subjects in this group

entered the room, they found a dime on the chair where they were going to sit. They were told by the experimenter that the dime must have been dropped by a previous subject and that they could keep it.

The judgment stage came when subjects were shown three sets of slides. The first 16 were ambiguous; that is, they were rated near the center of a pleasantness scale by a control group. The last 12 were a random mixture of pleasant and unpleasant slides. As seen in Table 1, subjects who had either been successful on the standardized task or who had found a dime on the chair

---

Insert Table 1 about here

---

consistently rated slides, particularly the ambiguous ones, as more pleasant than either of the other two groups rated them. The interpretation was that the positive mood of the subjects caused them to be more attentive to positive elements of the slides, and thus the slides were reported as being more positive.

Effects of Mood on Helping Behavior

Priming by mood affects not only judgments of how good or bad something is, but it also determines how likely a person is to perform some action such as helping behavior. Studies have consistently shown that people in positive moods are more likely to engage in some form of helping behavior*.

As in studies of priming, there are many ways of generating a mood and most seem to work equally well. One of the earliest studies in helping behavior was performed by Berkowitz and Conner in 1966, when they showed helping behavior could be affected by success at a performance task. Moore, Underwood, and Rosenhan (1973) found that merely thinking about pleasant thoughts could influence how willing people were to lend a hand to someone else. Isen and Levin (1972) were able to increase helping behavior by giving subjects a small bag of cookies.

Batson, Coke, Chard, Smith, and Taliaferro (1979) performed a field study in which subjects "chose themselves" by using a public pay phone in a hallway at the Student Union at the University of Kansas. The positive

---

*This assumes the person's good mood will not be put in jeopardy by helping. See Mood as a Source of Motivation.

mood group found a dime in the coin return while the control group found nothing. Further down the hallway, subjects encountered a chance to help someone in need: a female confederate who rose from her chair as the subjects approached and spilled a large folder of paper. Positive mood subjects helped the confederate 90% of the time while the control group helped only 60% of the time.

To explain the phenomenon, Batson et al. adopted an interpretation by Isen et al. (1978), which suggested that the enhanced mood had led to the recall of more positive aspects of prior similar situations. When the subjects decided whether to help or not, the positive results of helping were more available if the subject was in a good mood. As a result, they decided to help.

Mood as a Source of Motivation

The second theory about the cognitive influence of mood centers more on the mood itself than its effects. Here, I shall focus on decision making (more particularly, risk taking) rather than judgments, as motivational elements (reasons to perform an action) often come into play in decision making. Most people probably assume that people in positive moods are more willing to take risks than people in negative or neutral moods. Evidence from

research, however, seems to indicate that the opposite occurs in many situations.

Effects Mood on Decision Making

Isen and Patrick (1983) gave subjects 10 poker chips and told them the chips represented their credit for participating in the experiment. In the experiment, they were going to play roulette and they could bet as many of their chips as they chose to. If they had more than 10 chips when the experiment ended, they would get credit for participating plus an additional prize, commensurate with the number of chips they won. If they had less than 10 chips when the experiment ended, they would not receive credit for participating.

There were two manipulations: affect of the subjects (positive and neutral) and chance of winning (low, medium, high). Positive affect was induced by giving the subjects one McDonald's gift certificate.

Given the priming hypothesis, subjects in a positive mood should bet more than the subjects in a neutral mood. The subjects in a good mood should have more pleasant memories primed, making a positive outcome seem more likely, and thus making them more likely to bet.

The results from the experiment are shown in Table 2.

Insert Table 2 about here

As expected, the positive affect subjects did bet significantly more than the neutral mood subjects, in the low and medium risk groups. However, the trend was reversed in the high risk group. The positive mood subjects bet much less than they bet in the other two situations, and they bet considerably less than the neutral mood subjects in the same situation.

The explanation involves the motivation of the subjects. One hypothesis is that people who are in good moods want to preserve their moods, and thus are less willing to take risks that might jeopardize those moods. The evidence suggests that when people are in a good mood, they want to stay that way. This is a sort of emotional protectionism. For the high risk condition, not only are a large number of chips at stake, but so is the valuable positive mood.

When the risks are low, motivation is not nearly as important. Even when good mood subjects lost, their mood was maintained because the loss was trivial. Here priming

may be more central: subjects overestimate the likelihood of success and are very willing to bet.

People who are in negative or neutral moods are likely to be motivated to achieve positive mood states and thus may take the higher risks. Now the motivation works the other way: people who are in bad moods risk regardless of possible cost, because they have nothing to lose and a positive mood to gain.

Evidence supports both of these predictions. I shall review several studies which show this effect of mood as a motivational factor.

Risk of mood can be induced by placing the subject in a mood, and then in a real life decision situation, where there is a chance of loss and a chance of gain. This is typically done through a gambling scenario (e.g., "You have a 50% chance of losing $100 and a 50% chance of winning $200. Do you want to take the gamble?").

Another technique involves helping behavior. Subjects' positive moods can be put in jeopardy by placing them in a real life situation where they have the option of helping someone else or not helping. If some satisfaction is obtained from helping others, and if at the same time particularly demanding social behaviors can be unpleasant

to perform, then the scenario of helping someone is almost identical to the situation of gambling: The subject, after being placed in a mood, is presented with a situation in which there is a chance for gain and a chance for loss, and a decision must be made that will affect which occurs.

In the aforementioned study by Isen and Levin (1972), some subjects were given a small packet of cookies while studying in a library. Controls were given nothing. When the subjects were asked to volunteer to help a confederate, the positive mood subjects helped more. However, when another confederate, unknown to the subject, approached and requested aid in a task that would annoy other students in the library, the same positive mood subjects volunteered less often than controls.

When there was little risk involved in losing a good mood, subjects in enhanced moods were more willing to help, as the priming theory would predict. But when called upon to perform a task that would irritate someone else, and thus probably weaken or possibly destroy the subject's good mood, the response was the opposite. Once placed in a good mood, a person will protect that mood and avoid situations where there is a high probability of losing it.

Weyant (1978) found supporting evidence in his study of 263 college students. Using bogus aptitude tests, he induced positive and negative moods in students. Then he asked them to volunteer to help get donations for one of two charities. In the high cost (ie., high mood-risk) condition, subjects were asked to go door to door to collect donations for Little League baseball. In the low cost (ie., low mood-risk) condition, subjects were merely asked to sit at a donation desk. Weyant found that subjects in positive moods were more willing to perform the low risk task than the neutral or negative mood subjects, but less willing to perform the high risk task.

In a similar study, Isen and Simmonds (1978) induced good moods by placing dimes in a public phone for subjects to find. Subjects in a good mood were more willing than control subjects to help someone by reading and evaluating statements they were told would make them feel good, but less willing to help when they were told the statements might put them in a bad mood. Again, mood can act as a commodity, to be sought after, enhanced, or protected.

Mood as a Source of Information

Emotion is probably also a source of information about an individual's reactions to a particular person, risk, or

possible action. The theory states that when people are called upon to make judgments or decisions, they examine their own feelings and use these feelings as a source of objective information that indicates their reaction to or appraisal of something. That is, people infer what their own appraisals of situations are much as an outsider would if the same emotional information was available. This idea, of examining one's own feelings from an objective point of view as a clue to one's own reaction, is important in understanding the idea of attribution.

Attribution

Attribution refers to the process of ascribing one's own reactions to a cause. The basic premise is that the process of forming reactions to stimuli is not entirely conscious, and that we take stock of our feelings and try to figure out what causes us to feel the way we do.

The most common way to study this attribution effect is by inducing mis-attribution. That is, the subject is presented with a stimulus that invokes a reaction, then is induced to attribute that reaction to another stimulus.

White and Kight (1984) used male subjects who were physically aroused by running in place. A few bogus tests were administered and then subjects were shown a film of a

female confederate. They were asked to judge how much they were attracted to the female in the film.

There were three independent variables. One was the salience of the source of arousal. That is, how obvious was it that the reason for the physiological arousal was the exercise? In the high salience situation, clues to remind the subject about the exercise were left about as conspicuously as possible. For example, the jump rope was left hanging on the chair, a blood pressure cuff was left on the subject's arm, and the subject watched the video tape of the female in the same room where he exercised, with the lights on. In the low salience situation, the exercise and blood pressure test were performed in one room and the video tape was viewed in another room.

The second variable was confederate salience - whether the subject expected to meet the female or not. Under high confederate salience, the subject expected to meet the female and was told the experimenter was interested in how attracted they would be to each other. Under low confederate salience, the subject was told that the experimenter was comparing his reactions with the confederate and that the subject would not meet the confederate.

The third variable was the level of arousal. High arousal subjects exercised for 120 sec while the low arousal subjects only exercised for 15 sec.

White and Kight expected the high arousal, low exercise salience, high confederate salience group to report the most attraction toward the confederate. The results agreed: those subjects who experienced high arousal, had few cues to its real source, and who expected to meet the female from the film indicated they were strongly attracted to her. High arousal added to the natural attraction of the subjects toward the confederate only when they misattributed their arousal to an imminent meeting with this female.

Thus misattribution occurs only when the subject has some type of arousal to attribute, when the real cause for the arousal is not obvious or salient, and when the subject has some other possible cause to attribute the arousal to.

Several studies have used alcohol as a means of inducing arousal in subjects. McCarty, Diamond, and Kaye (1982) found that when subjects who were given alcoholic drinks were told they were non-alcoholic and then asked them to judge sexual slides, they rated them as more arousing than controls. Believing that the arousal they

were experiencing not to have been caused by the drink, the subjects misattributed and decided they were very aroused by the slides.

Effects of Attribution of Mood on Judgments

Arousal is assumed to be valence free. It is an important aspect of emotion and hence can contribute to subjects' interpretations about their affective reactions, but it is not itself an emotion. However, the same misattribution effects can take place if moods and emotions themselves are manipulated instead of merely physiological arousal.

The paradigm remains the same: if a subject believes that his or her preexisting emotional feelings are a reaction to a particular object, any evaluation of that object will be biased in an emotionally-congruent way, whether or not those feelings were actually produced by the object.

From this point of view, affective feelings represent cognitive appraisals of the personal significance of situations. Ordinarily, such reactions provide accurate feedback about one's appraisal; it is the representation of such appraisals that convey the nature and intensity of one's reaction to the relevance of the event for one's

concerns (Clore, 1988). Under certain co.ıditions ever, reactions can be misattributed to irrelevant stim resulting in biased judgments and decisions.

Schwarz and Clore (1983) performed two experiments to study the misattribution of mood. In the first experiment, mood was induced by asking subjects for vivid descriptions of recent happy or sad events. The experiment was conducted in a soundproof room; subjects were told the room would make them feel one of three ways: "tense and depressed," "elated and kind of high," or no information was provided at all. The subjects were asked to report general life satisfaction and happiness.

Misattribution was successfully generated. As predicted, subjects in bad moods, who had been told the room would make them feel uneasy, reported more satisfaction with their lives than subjects who were in a bad mood but had no prior expectations about the room. When they were asked to judge satisfaction, the subjects examined how they felt (bad), realized they felt that way because of the room (or so they thought), and thus did not use those negative feelings to make judgments about their lives. This has been referred to as the <u>discounting</u> effect (Kelley, 1971), because the subjects discounted aspects of

their own lives as a cause for their bad mood when they were given an alternate explanation, namely the soundproof room. On the other hand, subjects who were in bad moods and expected to be in good moods from the room reported less satisfaction with their lives. They expected the room to make them feel good, but found they felt bad, and decided this must have been because of unhappiness with their lives.

Subjects in a positive mood did not try to attribute their mood to the room, regardless of expectations. Subjects in positive moods had no need to discount their lives as reasons for their mood, and in fact did not want to. Feeling good about one's life is not something one wants to avoid.

In a second experiment, subjects again rated their life happiness and satisfaction. To achieve different moods in this experiment, subjects were called on rainy and sunny days, which is a valid predictor of mood. People misattribute their bad feelings caused by bad weather to their lives and thus report lower satisfaction on these days. Schwarz and Clore tried to get people to correct this misattribution and to give them a chance to discount their situation as the cause for their moods.

Subjects were called on the phone and asked questions about their satisfaction and happiness with life, presumably for an out-of-town university study. Some subjects, the no-priming group, were told nothing else. Other subjects were partially primed by a question immediately before the main questions: "By the way, how is the weather down there?" The rest of the subjects were fully primed, and told that the purpose of the call was to examine the effect of weather on people's moods.

The results, which are shown in Table 3, are consistent with the results from the previous experiment.

Insert Table 3 about here

When their attention was drawn to the weather, subjects in a negative mood attributed their bad mood to the bad weather and thus reported high satisfaction. Bad-mood subjects for whom weather was not salient, however, attributed their bad feelings to their life situations and thus reported lower life satisfaction.

Since this research was published, a number of other experiments aimed at comparing predictions of the priming and informational models have been performed.

Clore (1985) and Schwarz and Clore (1988) summarize a number of unpublished studies. The priming hypothesis predicts that mood will have some effect at encoding, when the subjects first form an interpretation of the stimulus. That is, affect at the time a novel stimulus is presented can determine how it is judged at recall. For example, if a person is in a positive mood when he or she encounters a stranger, then facets about that stranger will be encoded in positive terms. Hence, when asked later to evaluate the stranger, even negative affect should have little effect on the judgment, since there would be little negative material to be primed, and the stranger would therefore be judged positively.

The informational hypothesis, however, predicts that mood effects will occur primarily at the time of judgment. According to this theory, while the mood at the time of encoding may play a role in the judgment, the mood at judgment is really what determines how judgments are made. Thus even if the person had been in a positive mood when a stranger was first encountered, a negative mood at the time of judgment should result in a negative evaluation. Research by Clore, Parrott, Wilkins, and Schwarz (in preparation) supports this prediction, showing that mood

effects occur at the time of judgment rather than during encoding.

The priming interpretation also predicts that mood effects should occur only when judgments are made about ambiguous stimuli. Ambiguous information is open to biased interpretation on the basis of available concepts primed by mood, whereas unambiguous information should be less so. The informational hypothesis, on the other hand, suggests that mood is primarily used as information about one's reaction to the stimulus, so that the ambiguity of the stimulus is not a primary issue.

Wyer and Srull (1986) showed that judgments about objects can and often do occur without the subject accessing what they call Permanent Storage (similar to Long Term Memory), which is where all of the information on well known stimuli would be stored. They suggest that evaluations are made on the basis of readily available material in the Working Space (similar to Short Term Memory), which would contain the mood at the time of recall. Therefore, judgments could be made about even a well known item on the basis of mood at the time of recall alone. Consistent with this interpretation, Clore, Schwarz, and Robbins (1985) showed that mood affects

positive, negative, and ambiguous objects of judgment equally.

Method

Overview

The experiment was conducted in a small soundproof room in the Psychology building. Subjects were placed in a positive or negative mood through their description of a happy or sad event. Half of the subjects were made to attribute their mood to the soundproof room, and the other half were not encouraged to make such an external attribution. Subjects were then asked to answer questions about eight monetary gambles, indicating goodness, probability, and choice for each gamble.

Subjects

Subjects were 66 undergraduates (33 males and 33 females) enrolled at the University of Illinois and participating in the study for course credit.

Procedure

Two subjects of the same sex were run at a time in the small soundproof room where the experiment was carried out. Subjects were told that the study was being conducted there, since it was the only room available at that time. They were also told that in previous studies, subjects had reported feeling unusual after spending a period of time in the room. Positive mood subjects were told they reported feeling happy or giddy, while negative mood subjects were

told they reported feeling anxious or uneasy. All subjects were then asked to fill out a rating sheet for the room, answering questions about size, ventilation, lighting conditions, and how uneasy and anxious (or happy and giddy) it made them feel. For half of the subjects, the rating forms were immediately collected, and for the other half they were collected later.

To induce mood, subjects were instructed to write about a recent experience. The positive mood group was told to write about a happy event, while the negative mood group was told to write about a sad event. In addition, subjects in the positive group were given hard candy before the experiment began.

Subjects were told they would have fifteen minutes in which to write about the event, but were interrupted after only eight minutes, supposedly in the interest of time. This was done to increase the potency of the mood manipulation, since it has been shown that subjects who are interrupted from writing about an affectively laden event show a greater tendency to make ratings congruent with the mood than subjects who are allowed to finish their descriptions (Martin, 1986).

At this point, the room rating forms were collected from the other half of the subjects. This procedure was intended to remind them that the room might them feel a certain way, and cause them to attribute their feelings to the room.

Eight gambles of the following forms were presented to each subject:

> Suppose you were given a choice between receiving $3000 with certainty or having an 85% chance of winning $5000.
>
> Suppose you were given a choice between LOSING $3000 with certainty or having an 85% chance of LOSING $5000 (vs a 15% chance of losing nothing).

All gambles offered the choice between a certain gain (or loss) versus the possibility of either winning (or losing) a larger amount or winning (or losing) nothing.

The presentation of each gamble was followed by three questions. They first asked subjects to rate how good it would be if they took the gamble and won (or lost nothing) or how bad it would be to take the gamble and lose (or win nothing).

The eight gambles represented, therefore, the combinations of win versus loss (Result) for large versus

small amounts (Siz nd in questions which focused subjects' attentio ither on taking the gamble and winning or taking the gamble and losing (Emphasis).

The presentation of the conditions for gambles were followed in each case by three questions, which provided the values for the dependent variables. The first one (Goodness) asked about the goodness of winning or the badness of losing:

How good do you feel it would be to take the gamble and win the $5000?

1 2 3 4 5 6 7

Extremely Moderately Not at all

The second (Probability) asked about the subjective likelihood of actually winning the gamble:

To what extent do you feel you would actually win if you took the gamble?

1 2 3 4 5 6 7

Extremely Moderately Not at all

The third question (Choice) asked subjects to choose between a certain gain (or loss) and a possible larger gain (or loss).

Imagine that you are faced with that choice and indicate which you would actually choose.

85%
Chance of
Winning
$5000

Winning
$3000 with
Certainty

:_____:_____:_____:_____:_____:_____:_____:_____:_____:

definitely choose | probably choose | can't decide | probably choose | definitely choose

All subjects received the same gambles, except that half of the subjects had the order of the first two gambles reversed. Thus the first and second gambles for one half were the second and first gambles for the other half. The gambles differed only in that one dealt with a possible large win situation while the other dealt with a possible large loss situation. It was felt that considering a loss gamble first would focus subjects on avoiding losses for the remainder of the gambles, while considering a win gamble first would focus subjects on achieving gains. The

order of the remaining six questions was identical for both halves.

After subjects completed all of the gambles, they filled out a mood rating scale, on which they ranked how happy and how sad they felt. The self-rating was described as a further check of the effect of the soundproof room.

Finally, all of the subjects were given a complete debriefing, in which the nature of the study and purpose of the soundproof room were fully explained. Upon questioning, several subjects reported they did not believe the deception involving the room, but none were able to guess the true intention of it.

Results

The analysis involved three between group variables (mood x attribution x order) and three repeated measures variables (size x emphasis x result). A 2x2x2x2x2x2 analysis of variance (mood x order x attribution x size x result x emphasis) was done.

I will review the results with a section devoted to each of the following concerns: the manipulation of mood, the influence of gamble type on choice of risk, the effect of mood on risk, the effect of mood on probability estimates, the effect of misattribution on mood effects, and the relationship between questions of goodness, probability, and choice.

Validation of Mood Manipulation

A check of the effectiveness of the mood manipulation showed it to be effective. When mood was expressed as ratings of happiness minus sadness, the mood manipulation had a significant effect on mood self-rating, $t(65) = 2.36$, $p < .05$. When the happy and sad items were analyzed separately, self-ratings of sadness, but not self-ratings of happiness, showed a significant effect of the happy versus sad mood manipulation.

Influence of Gamble Type on Choice of Risk

Several aspects of the gambles influenced risk-taking, but the size of the possible win or loss proved to be the most important dimension, $F(1,58) = 48.36$, $p < .001$. As seen in Table 4, subjects were more willing to

---

Insert Table 4 about here

---

take risks on small gambles ($M = 4.163$) than on large gambles ($M = 5.576$) (Note: large numbers indicate a preference for certainty, or less risk-taking.).

A second effect on risk-taking was a main effect for emphasis, $F(1,58) = 7.9$, $p < .01$. Emphasis refers to whether the initial question about each gamble asked how good a win would be or how bad a loss would be. When the questions drew attention to the goodness of a possible win, then subjects took more risks ($M = 4.720$) than when the questions drew attention to the badness of a possible loss ($M = 5.019$).

Another effect on risk-taking, though less significant, was a main effect for the result of the gamble, $F(1,58) = 3.5$, $p < .07$. When the gambles involved the possibility of

winning money, subjects showed a greater preference toward risk-taking (M = 4.549) than when the gambles involved the possibility of losing money (M = 5.190).

The Effect of Mood on Risk

The most interesting effect was a mood x order x attribution x size interaction, $F(1,58) = 6.05$, $p < .02$.

The cell means from the interaction (in Table 5) show that mood affected mainly small gambles only. Choices

---

Insert Table 5 about here

---

depended on whether subjects had an initial orientation toward avoiding losses or achieving gains (i.e., the order variable). The most dramatic effects occurred when subjects were motivated to achieve gains (i.e., the first gamble they answered questions about was a large win gamble). The differences of interest are in the non-attribution condition (in which the room was not made salient as a possible cause for subjects' feelings). When they considered gambles with small risks, subjects in the non-attribution condition showed a dramatic preference for

certainty when sad (M = 5.16) and an equally dramatic preference for risk when happy (M = 3.53).

In the case of subjects with an orientation toward avoiding losses (ie. having received a large loss gamble first), small gambles had a very different effect. In these cases, there was no longer a sizable difference, and indeed there was a trend toward happy, non-attribution subjects preferring certainty (M = 4.56) while the sad subjects were risk oriented (M = 3.81).

The Effect of Mood on Subjective Probability Estimates

Mood effects occurred for some probability estimates as well as the risk estimates. As seen in Table 6, mood

---

Insert Table 6 about here

---

effects for probability estimates were seen most prominently in loss situations (whether large or small losses), particularly in light of a mood x emphasis interaction, $F(1,58) = 4.80$, $p < .05$. Sad subjects who were asked about the goodness of a win were more pessimistic about their chances of winning than happy subjects in the same condition. The opposite was true for

subjects who were asked about the badness of a loss; under these condition, happy subjects were more pessimistic than sad subjects.

The Effect of Misattribution on Mood Effects

Looking back to the interaction tabled in Table 5, the effect of subjects' attributions can be seen clearly. For all attribution subjects (whose affective reactions at the time of judgment were explained away to the soundproof room), there was no longer an effect of mood. Happy (M = 4.56) and sad (M = 3.69) subjects who had been oriented toward achieving gains no longer differed significantly, just as the happy (M = 3.84) and sad (M = 4.41) subjects who had been oriented toward avoiding losses failed to differ significantly.

Relationship Between Goodness, Probability and Choice

A brief investigation of Table 7 shows s
correlations between the goodness of winning, probability of winning, and choice of risk when winning was emphasized. When the four correlations in this condition between goodness and probability were averaged, r = .50. In addition, rating the risky alternative as especially good was also related to risk-taking, average r = .71. Finally,

the subjective probability of winning was also related to risk-taking for these subject for whom the questions emphasized winning (r = .5).

When the badness of losing was emphasized, results were mixed but largely statistically insignificant. The only significant relationship for these subjects was that rating losing as worse tended to lead to increased optimism, average r = .28.

Discussion

Overall, gambles of the type studied here are of interest precisely because most people show an exaggerated preference for certainty, even when, on the basis of the expected value of the alternatives, the risky choice is advantageous. In the present study we hoped to reduce this preference in order to increase the likelihood of detecting the effects of other variables. It is interesting, therefore, to note what variables change this somewhat surprising tendency toward conservatism. On the basis of the present results, there appear to be two kinds of relevant variables: gamble variables and subject variables.

The most effective gamble variable was size; subjects were significantly more willing to take risks when they involved small rather than large amounts. Less important was whether the questions focused subjects' attention on winning or losing (Emphasis), and whether the gamble involved losses or gains (Result). Gambles that were most likely to result in risk-taking were those in which winning was emphasized and involved potential gains.

The subject variable of relevance was mood. When there was a significant mood effect, it generally pointed toward subjects in happy moods exhibiting a greater tendency to

take risks. What emerges, then, is a more or less consistent tendency for subjects to avoid risk except when potential losses are minimal, when winning is made more salient, and when they are in positive moods.

In the present study there were no effects of mood on evaluation of the goodness of winning or the badness of losing. In a related vein, Weber and Clore (1988) also found no effects of mood on ratings of the attractiveness of gambles.

With respect to probabilities, there were mood effects on some gambles. In particular, mood effects were found when the gamble was introduced by questions that encouraged subjects to focus on winning rather than losing (e.g., rating the goodness of winning rather than the badness of losing). When the gambles involved losses (either small or large) and winning was emphasized (by the wording of the question), sad subjects were more pessimistic than were happy subjects, with sad subjects rating the gambles as less likely to have a positive result than happy people did. When losses were emphasized, on the other hand, happy subjects were more pessimistic.

With respect to choices, the nature of the mood effects depended on whether the session began with a large win or a

large loss gamble. The effects of this variable were surprisingly consistent. We assume that considering a loss gamble first made subjects approach the remainder of the gambles with a motivation to avoid losses, while those who began the session with a large win gamble were subsequently motivated to achieve gains. When motivated to achieve gains, happy subjects were more likely to take risks than were sad subjects. Sad subjects, on the other hand, indicated a preference for certainty. When motivated to avoid losses, subjects in general tended to be more conservative, choosing certainty more often than risk, with little difference between happy and sad subjects. When either group was given a chance to attribute away their mood to the room, mood effects disappeared, and mood was no longer associated with a preference for either certainty or risk-taking.

The question arises as to why the loss-first group did not show a similar effect. The answer may be related to a motivation on the part of the loss-first group toward avoiding losses (rather than toward achieving gains), since risk-taking behavior was seen only in situations in which winning was emphasized. In a sense, then, mood can be thought of as one more variable whose influence is not

unlike the several situational variables such as Size (small versus large gambles), Order (win first versus loss first), Emphasis (whether the questions ask about wins or losses), and Result (whether the gamble involves possible wins versus losses). Whenever winning was made salient and significant losses were deemphasized, risk-taking was more likely. Only when these influences converge, do we see a genuine tendency toward risk-taking, the most important of these influences being mood, order, and size of the gamble.

Taking as a default model, a basic subjective expected utility function, it might be assumed that a subject's choice of whether to take a risk or not, depended, in part, on the value he placed on the amount that could be won and the likelihood of winning it. One question that can be asked, therefore, is whether there is any evidence that these factors played a role. Relevant evidence comes from the correlation matrix in Table 7. As previously alluded to, large, consistent, and sensible relationships obtained between value, subjective probability, and choice appeared only in the win emphasized conditions. When subjects were encouraged to focus on the badness of losing, inconsistent and unexpected relationships resulted.

Results of the study provide support for the theory of misattribution, as well as further evidence of a motivational influence on risk-taking. As we expected, sad and happy moods were induced, and significant mood effects were observed, which disappeared under attribution conditions, indicating subjects had discounted their mood to the soundproof room.

Just as Isen (1983) found in a gambling study, the most risk-taking was found in subjects who were in happy moods and were presented with small gambles. That is, happy subjects showed the most risk-taking, but only when the stakes were low, so as to protect their positive mood. On a bigger scale, the results seem to suggest that happy people do not tend to take large, irrational gambles that you might associate with someone in a good mood. Happy people are cautious when faced with large gambles, not foolish.

Finally, one of the most important observations to be made about the data is that there is a particular set of conditions that is required to observe mood or attribution effects. Specifically, people (regardless of mood) will take risks only when that risk is minimized (e.g., the size of the gamble is small, the possibility of winning is

emphasized, etc.). In addition to the emphasis of the question asked, the size of the gamble, and mood of the subject, other variables such as whether the subject is oriented toward achieving gains or avoiding losses seem to be important.

Bibliography

Anderson, J. R. & Bower, G. H. (1973). Human associative memory. Washington, D.C.: Winston & Sons.

Batson, C. D., Coke, J. S., Chard, F., Smith, D., & Taliaferro, A. (1979). Generality of the "Glow of goodwill": Effects of mood on helping and information acquisition. Social Psychology Quarterly, 42, 176-179.

Berkowitz, L. & Connor, W.H. (1966). Success, failure, and social responsibility. Journal of Personality and Social Psychology, 4, 664-669.

Clore, G. L. (1985, August). The cognitive consequences of emotion and feeling. Emotion and Feelings. Symposium conducted at the meeting of the American Psychological Association, Los Angeles.

Clore, G. L. (1988). Functional Feelings. Paper delivered at a symposium of the Midwestern Psychological Association: Chicago, 1988.

Clore, G. L., Parrott, D., Wilkins, J., & Schwarz, N. (in preparation). Do mood effects occur at encoding in judgment?

Clore, G. L., Schwarz, N., & Robbins, D. (in preparation). The role of stimulus ambiguity in mood effects.

Isen, A. M. (1987). Positive affect, cognitive processes, and social behavior. Advances in Experimental Social Psychology, 20, 203-253.

Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. Journal of Personality and Social Psychology, 52, 1112-1131.

Isen, A. M., Johnson, M. M. S., Mertz, E., & Robinson, G. (1985). The influence of positive affect on the unusualness of word association. Journal of Personality and Social Psychology, 48, 1413-1426.

Isen, A. M., & Levin, P. F. (1972). The effect of feeling good on helping: Cookies and kindness. Journal of Personality and Social Psychology, 21, 384-388.

Isen, A. M., Means, B., Patrick, R., & Nowicki, G. (1982). Some factors influencing decision-making strategy and risk taking. In M.S. Clark & S. T. Fiske (Eds.), Affect and cognition: The 17th annual Carnegie Symposium on Cognition, (pp. 243-261). Hillsdale, NJ: Erlbaum.

Isen, A. M. & Patrick, R. (1983). The effect of positive feelings on risk-taking: When the chips are down. Organizational Behavior and Human Performance, 31, 194-202.

Isen, A. M., & Shalker, T. E. (1982). Do you "accentuate the positive, eliminate the negative" when you are in a good mood? Social Psychology Quarterly, 45, 1-12.

Isen, A. M., Shalker, T., Clark, M., & Karp, L. (1978). Affect, accessibility of material in memory and behavior: A cognitive loop? Social Psychology Quarterly, 36, 1-12.

Isen, A. M., Simmonds, S. F. (1978). The effect of feeling good on a helping task that is incompatible with good mood. Social Psychology Quarterly, 41, 345-349.

Kelley, H. H. (1971). Causal schemas and the attribution process. In E. E. Jones et al. (Eds.), Attribution: Perceiving the causes of behavior. Morristown, NJ: General Learning Press.

Loftus, E. F. (1973). Activation of semantic memory. American Journal of Psychology, 86, 331-337.

Martin, L. L. (1986). Set/Reset: Use and disuse of concepts in impression formation. Journal of Personality and Social Psychology, 493-504.

McCarty, D., Diamond, W., & Kaye, M. (1982). Alcohol, sexual arousal, and the transfer of excitation. Journal of Personality and Social Psychology, 42, 977-988.

Meyer, D. E. & Schvaneveldt, R. W. (1971). Facilitation in

recognition between pairs of words: Evidence of a dependence between retrieval operations. Journal of Experimental Psychology, 90, 227-234.

Moore, B. S., Underwood, B., & Rosenhan, D. L. (1973). Affect and altruism. Developmental Psychology, 8, 99-104.

Rholes, W. S., Riskind, J. H., & Lane, J. W. (1987). Emotional states and memory biases: effects of cognitive priming and mood. Journal of Personality and Social Psychology, 52, 91-99.

Schwarz, N. & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. Journal of Personality and Social Psychology, 45, 513-523.

Schwarz, N. & Clore, G. L. (1988). How do I feel about it? The informative function of affective states. In K. Fiedler & J. Forgas (Eds.), Affect, Cognition, and Social Behavior. Toronto: Hogrefe International.

Teasdale, J. D. & Fogarty, S. J. (1979). Differential effects of induced mood on retrieval of pleasant and unpleasant events from episodic memory. Journal of Abnormal Psychology, 88, 248-257.

Tulving, E. & Pearlstone, Z. (1966). AVailability versus accessibility of information in memory for words. Journal of Verbal Learning and Verbal Behavior, 5, 381-391.

Tversky, A. & Kahneman, D. (1973). AVailability: A heuristic for judging frequency and probability. Cognitive Psychology, 5, 207-232.

Tversky, A. & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. Science, 185, 1124-1131.

Weyant, J. M. (1978). Effects of mood states, costs, and benefits of helping. Journal of Personality and Social Psychology, 36, 1169-1176.

White, G. L. & Kight, T. D. (1984). Misattribution of arousal and attraction: Effects of salience of explanations for arousal. Journal of Experimental Social Psychology, 20, 55-64.

Wyer, R. S. & Srull, T. K. (1986). Human cognition it its social context. Psychological Review, 93, 322-359.

Wyer, R. S. & Srull, T. K. (1980). The processing of social stimulus information: A conceptual integration. In R. Hastie, T. M. Ostrom, E. B. Ebbesen, R. S. Wyer, D. L. Hamilton, & D. E. Carlston (Eds.), Person memory:

Cognitive basis for social perception. Hillsdale, NJ: Lawrence Erlbaum Associates.

Young, P. T. (1961). Motivation and emotion. New York: Wiley.

Table 1

Mean Ratings of the Pleasant, Unpleasant, and Ambiguous Slide from Subjects in Each Mood Condition

Mood Condition	Slide Type		
	Pleasant	Ambiguous	Unpleasant
Dime	6.28	5.14	3.55
Success	6.36	4.83	3.28
Control	6.01	4.73	3.33
Failure	5.84	4.11	2.84

Table 2

Mean Number of Chips Bet, Variances, and Proportion of Subjects Betting, in Each of Six Conditions

Condition	Positive affect	Neutral affect
High Risk		
Mean	.455	2.56
Variance	.89	12.25
Proportion	3/11, .27	4/9, .44
Moderate Risk		
Mean	4.1	2.75
Variance	12.89	3.19
Proportion	7/10, .70	9/12, .75
Low Risk		
Mean	3.67	1.54
Variance	3.56	6.56
Proportion	11/12, .92	4/13, .31

Table 3

Mean Ratings of General Happiness, Desire to Change, and Life Satisfaction: Experiment 2

Dependent variable	Priming		
	None	Indirect	Direct
General Happiness			
Sunny	7.43	7.29	7.79
Rainy	5.00	7.00	6.93
Desire to Change			
Sunny	3.93	3.43	3.57
Rainy	5.79	4.57	4.93
Life Satisfaction			
Sunny	6.57	6.79	7.21
Rainy	4.86	6.71	7.07

Table 4

Mean Choice for Each Gamble Type

Gamble Type	Emphasis	
	Win	Lose
Win		
Small	3.818	3.636
Large	5.697	5.045
Loss		
Small	4.606	4.591
Large	5.955	5.606

Note. Large numbers indicate a tendency toward certainty.

Table 5

Mean Choice for Each Gamble Type by Mood of Subject by Motivational Orientation

	Attribution			
	None		Room	
Mood and	Orientation		Orientation	
Gamble Size	Achieve Gains	Avoid Losses	Achieve Gains	Avoid Losses
Sad				
Small Gamble	3.81	5.16	4.41	3.69
Large Gamble	5.88	5.56	5.22	5.28
Happy				
Small Gamble	4.56	3.33	3.84	4.56
Large Gamble	5.64	5.25	5.91	5.91

Table 6

Mean Subjective Probability of Winning

	Result of Gamble			
	Loss		Win	
	Emphasis		Emphasis	
Mood	Badness of Loss	Goodness of Win	Badness of Loss	Goodness of Win
Sad	2.48	2.56	3.87	3.37
Happy	3.12	4.82	3.63	3.43

Note. High numbers indicate pessimism.

Table 7

Correlations between Goodness and Probability, Goodness and Choice, and Probability and Choice by Gamble Type

	Correlation Pairs		
Gamble Type	Good/Prob	Good/Choice	Prob/Choice
Win Emphasis			
Large Gamble			
Win	.54	.69	.50
Loss	.40	.59	.37
Small Gamble			
Win	.59	.80	.55
Loss	.56	.76	.58
Loss Emphasis			
Large Gamble			
Win	.24	-.09	-.42
Loss	.28	-.12	-.28
Small Gamble			
Win	.12	-.28	.32
Loss	.49	-.17	-.10